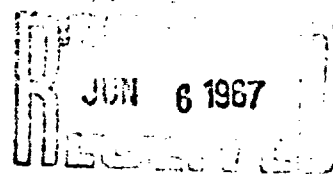


IMMUNIZATION IN THE ARMED FORCES AND ITS IMPORTANCE FOR THE PROPHYLAXIS AND  
LIQUIDATION OF INFECTIOUS DISEASES

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## IMMUNIZATION IN THE ARMED FORCES AND ITS IMPORTANCE FOR THE PROPHYLAXIS AND LIQUIDATION OF INFECTIOUS DISEASES

[Following is the translation of an article by I. I. Rogozin, Major General Medical Service and Corresponding Member of the AMN USSR, published in the Russian-language periodical Voyenny Meditsinskiy Zhurnal (Military Medical Journal), No 10, 1964, pages 44--47. Translation performed by Sp/7 Charles T. Ostertag, Jr.]

The systematic immunization of personnel in the armed forces has demonstrated to a sufficient degree the effectiveness of this measure, especially for the prophylaxis and liquidation of individual infectious diseases.

In spite of the indisputable achievements in the immunization of human beings, over a period of many years the scientific discussion on the question of inoculations has not ceased. This was connected with the fact that Prof. D. F. Pletsitsy, in December 1962, came out with an article concerning the lowering of the natural resistance of an organism under the influence of artificial immunization. He stressed that with this he was not against inoculations, but that he considered it his duty to issue a warning about this influence of immunization on an organism. The article aroused numerous responses. In the middle of 1963 all the published materials were discussed at a meeting of the departmental bureau for Hygiene, Microbiology and Epidemiology, AMN, USSR. In its decision the bureau also pointed out the importance of a further study of the specific weight of prophylactic inoculations in the overall system of measures for combating infectious diseases. It also stressed the necessity of a detailed study of cases of complications, emerging as a result of prophylactic inoculations, and a note was made of the positive role of such inoculations for the liquidation of diseases.

The problem of inoculations is also being widely discussed outside of our country. Thus, the article by Benenson on problems of immunization was published in the American Military Medical Journal (1963). The following data concerning vaccines were published in it.

### In Standard Use

Smallpox\*  
Yellow fever\*  
Poliomyelitis\*  
Parotitis  
Adenovirus  
Influenza  
Rabies  
Typhus  
Spotted fever

### In Development Phase

Rift Valley fever  
Venezuelan Equine Encephalomyelitis\*  
Eastern Equine Encephalomyelitis  
Western Equine Encephalomyelitis  
Measles\*  
Q fever  
Typhus (strain E)\*  
Tularemia\*  
Anthrax

#### In Standard Use

Rocky Mountain fever  
Typhoid  
Plague  
Cholera  
Pertussis  
Diphtheria  
Tentanus

#### In Development Phase

Leptospirosis  
Botulinum

#### Under Study

Russian Spring Summer Encephalitis\*  
Trachoma  
Ornithosis  
Tuberculosis  
Brucellosis  
Shigellosis  
Staphylococcal Infection

In this list attention is turned to the practical application of a significant number of living vaccines. Up until recently American investigators preferred to use killed vaccines. Along with this data the author presented materials on the quality and effectiveness of individual preparations, and also information on complications observed in experimental animals after the use of a large amount of antigens. Here note is made of periarteritis nodosa, amyloid or collagen disease. The author stresses that nobody has observed such phenomena in human beings.

O. V. Baroyan cites data from the World Health Organization (WHO) concerning 21 prophylactic preparations accepted for use at the present time and 16 preparations being readied to be put into practice. These figures diverge somewhat from the data of Benenson. However, it is important that one has to consider the possibility of using dozens of preparations for inoculations.

Among the problems of active immunization attention is merited to the reports by a number of authors on the new principle of developing vaccines against viral infections. This principle is based on the fact that the administration of one virus protects against infection with another virus without the presence of antibodies against the second causative agent. Such reports were published still earlier in Italy. Salvioli and Piatetsi reported that following the immunization of animals with killed vaccines from the Cox bacillus and the Salvioli liquid vaccine, they obtained resistance in animals against experimental viral infections. Material has also been obtained testifying to the high effectiveness of vaccines against adenovirus infections. This data testifies to the extensive study of problems of immunization both in the USA and in other countries; they are of significant interest in clearing up the role and importance of inoculations for the reduction and liquidation of infectious diseases.

\*Attenuated living vaccine

In this report we want to give a correct evaluation of the importance of inoculations and their reactogenicity. We cannot agree with the investigators who consider that the reaction to inoculation is a "minor" infection of the same form against which the immunization is applied. We consider that a main difference exists between the vaccinal process and an infection of any severity. During vaccination, even with live vaccine, none of surrounding persons can be infected from the inoculated person, while a sick person can always become a source of infection for surrounding persons. The reaction to inoculation can be regulated by the persons carrying out the immunization. Such reactions should always have a favorable outcome. During an infection of any severity the outcome depends on many circumstances, and mainly on the condition of the patient. The role of inoculations is not the same for various groups and forms of diseases. Inoculations against the group of aerial-droplet diseases are the most effective. Among these it is necessary most of all to point out the exceptional importance of inoculations against the group of aerial-droplet diseases are the most effective. Among these it is necessary most of all to point out the exceptional importance of inoculations against smallpox. Along with this it is known that after this infection was brought into the European countries very large outbreaks of smallpox developed there. This was connected with the fact that many persons had not received a timely revaccination against smallpox. This led to the mission for the systematic revaccination of personnel and for constant information on the state of inoculation of the population. There is no doubt that the completely favorable state in the armed forces in respect to smallpox is guaranteed only by the presence of immunity in every member of the collective.

An important place in prophylaxis may be filled in the event of the necessity of inoculation against parotitis. Such inoculations may be recommended following the appearance of epidemic indications. In spite of the numerous investigations, up until now effective preparations have not been obtained against influenza and other respiratory diseases. Nevertheless such preparations can play an important role in the prophylaxis of these widely spread infections.

Vaccination against tuberculosis is carried out on a comparatively small number of persons, however, it is necessary to objectively resolve the problem concerning the periods of inoculations and the methods for performing them. In children's collectives wide use of intracutaneous inoculations has begun. To what degree this method is acceptable for adults must be resolved in the near future.

As a rule, for the group of intestinal diseases inoculations have only a booster importance in the overall system of measures; most important are the good organization of the communal-daily living conditions, the disposition of the population, the appropriate sanitary-hygienic safeguarding of feeding and water supply, and personal hygiene. Nevertheless, inoculations against a number of diseases in this group are very important. During the course of the present century a study has been made of the effectiveness of inoculations against typhoid and paratyphoids. It is considered that inoculations may reduce morbidity by 4--10 times.

...a study was made of the effect of inoculations against cholera. After an initial high incidence of the disease, vaccination against cholera was begun. It was revealed that they had a significant influence on lowering dysentery incidence. Exchange of information and preparations of intestinal vaccine led to new investigations in this direction. Inoculations were facilitated by the inclusion of complete cultures of the bacteria causing dysentery in the composition of a polyvalent vaccine. However, a further study of the role of such inoculations showed that the preparation of the vaccine did not produce positive results. This led to the fact that the bacteria causing dysentery were excluded from the composition of the vaccine.

It is recommended that inoculations against cholera be carried out only based on epidemic indications. Here a monovaccine against cholera is used. Such inoculations lead to a ten-fold reduction in incidence. The selection of strains for preparing the vaccine is very important for inoculation against cholera. In recent years in many places the El Tor strain has been included in protein vaccine.

Great significance may be gained by inoculations against transmission [vector] diseases (for example, immunization against typhus). These inoculations may be carried out based on epidemic indications. In the years of the Great Fatherland War they proved to be sufficiently effective in respect to wiping out lethality among inoculated persons who became ill. At the present time attention is drawn to the possibility of using a vaccine made from the E strain. However, a number of problems must still be resolved here, especially in regard to reducing the reactogenicity of such a vaccine.

As a rule vaccines against vector zoonoses are used in enzootic regions when natural foci are present. The vaccine against tularemia proved to be the most effective. Even during outbreaks incidence among humans was ended in 12 days after the beginning of the inoculations. This is why such inoculations may rightfully be considered a means for the eradication of infection among humans. However, for the eradication of natural foci wider measures of a national-economic nature are required. Inoculations against other diseases of this group are less effective, but they also may turn out to be necessary for the prophylaxis of diseases in natural foci.

In respect to the group of diseases, the causative agent of which penetrates through the external covering, it is necessary to point out the very effective immunization against tetanus. Actually such inoculations led to the eradication of tetanus incidence among wounded persons who were inoculated and revaccinated with tetanus toxoid. It should be expected that on this basis it is possible to resolve the problem concerning the prophylaxis of gas gangrene and other diseases, against which it is possible to use toxoids as inoculation preparations. The value of inoculations with toxoids is increasing still more in connection with the fact that such immunization creates a grund-immunität.

\*[Grund-immunität = German expression meaning "immunity against a fatal dose."]

A brief enumeration of the groups and individual forms, against which inoculations are possible, shows the necessity for the associated use of individual preparations. Actually, when carrying out successive inoculations a minimum period of 1--1½ months is required for the onset of immunization with a new preparation. The full course of inoculations in its turn requires 20--30 days. For ensuring immunization with the help of the minimum required number of antigens too much time would be required. Under these conditions a natural outlet is the application of combined immunization. In VMZh No 1 for 1960 [VMZh = Military Medical Journal] an article by a group of authors appeared, in which the effectiveness of such immunization was demonstrated when 11 antigens were used. The reactogenicity of the inoculations turned out to be fully enduring. It only insignificantly exceeded the indices of reactogenicity when individual preparations were used.

As is known, various preparations are used for immunization. Among these particular attention is merited by vaccines prepared from live attenuated causative agents. However, up until the present time wide use is made of killed corpuscular vaccines, preparations from complete antigens and toxoids. With sufficient reason the latter are treated as chemical vaccines. They turned out to be very convenient for application as combined preparations. It is especially important to note that purification of chemical preparations from ballast [might be translated as unnecessary] substances made it possible to considerably increase the volume of antigens introduced. This made it possible to limit the initial immunization to a single (polyvaccine) or double (toxoids) administration of preparations. This explains why up until now such great attention is given to the improvement of chemical vaccines.

The materials presented make it possible to draw the following conclusions. Immunization of humans occupies an important place in the system of reducing and eradicating infectious diseases. The role of inoculations against separate groups and various forms of infections is not the same. Particularly promising are inoculations against aerial-droplet infections, vector (especially zoonotic) infections, and diseases against which it is possible to use toxoids for immunization. Special attention is merited by the feasibility of carrying out combined immunization, since this makes it possible to reduce the number of injections which would have to be given in the case of separate inoculations. Though such inoculations may be carried out with any preparations, chemical vaccines are most suitable for this. As a rule inoculations are accompanied by a vaccinal process which is primarily different from the infectious process. The positive role of inoculations considerably surpasses the shortcomings of reactions in inoculated persons.